

well be enforced in Africa. As it is, there is one method adopted in the Western Congo, another in South Africa, a third in East Africa, and a fourth in West Africa and the Sudan. Mr. McLaren, in the Kafir grammar under review, adopts the South African standard; the three clicks which Lepsius expresses by /, /, and // are rendered (as they have been for half a century) by *c*, *q*, and *x*.

Now throughout Eastern Africa, *c* or *ch* is used to express the palatal consonantal combination of *tʃ* which in South Africa and many West African missionary grammars is rendered by *tsh*; *q* is universally used in North, North Central, and Western Africa (besides by Lepsius) to transliterate the Arabic ق—*qof*, a very explosive *k*, the old meaning of the Mediterranean *q*. *X* is used by the Congo missionaries (following the Portuguese) as an equivalent for the English *sh* (*ʃ*), and by others as a convenient form of the Greek χ to express the strong guttural *kh* (Scotch and German *ch*). On the other hand, *kh*, *sh*, and *zh* in transliterations into Roman letters of Hindustani and Arabic names are intended to be pronounced literally like an aspirated *k*, *s*, and *z*. It is therefore necessary for a logical orthography to adopt *c*, *q*, and *x* for the purposes above mentioned, namely, to represent the English *ch*, the Arabic ق and the Greek χ. Therefore it would be preferable to render the South African clicks by other signs, such as those proposed by Lepsius.

For the practical purposes of those who wish to acquire the Kafir language or arrive quickly at an understanding of its main features, Mr. McLaren's grammar may be very highly commended.

H. H. JOHNSTON.

MINING LAW.

Mining Law of the British Empire. By Charles J. Alford. Pp. xii+300. (London: Charles Griffin and Co., Ltd., 1906.) Price 8s. 6d. net.

ALTHOUGH admirable treatises on mining law for the guidance of lawyers have been written by Rogers, Walmesley, McSwinney, Bainbridge, Cockburn, and numerous foreign authors, the field has by no means been exhausted; and Mr. Alford's work forms a welcome addition to technical literature. Written with conspicuous literary skill by a mining engineer of wide experience, it gives a concise summary of the various codes of mining law of the British possessions throughout the world, with well considered remarks on their characteristics. The term mining law is taken by the author to mean the enactments that regulate the acquisition and tenure of mining rights. Mining regulations, which control the methods of working mines, receive merely incidental mention. In the case of Great Britain, it is true, the Mines Regulation Acts are quoted at some length as models; but even in this case no reference is made to the Amendment Act of 1903 or to the numerous special statutes, of which fourteen are cited in Sir C. Le Neve Foster's "Ore and Stone Mining," that affect miners and workers in open pits in this country. Indeed, Mr. Alford's chapter on the

mining law of Great Britain is the least striking in the book. Mining in Great Britain is so largely a matter of contract between lord and lessee, and so largely concerned with non-metallic minerals, that there is little scope for the comparative treatment of the metal-mining rights and obligations that forms so interesting a feature of the chapters dealing with colonial laws.

The historical study of the inception of mining law receives, as is to be expected in a book of a purely practical character, only brief mention, and the author has refrained from the temptation of citing the ancient statutes set forth in that delightful old work on mining law, the "Fodinæ Regales" of Sir John Pettus, Knight (1670). Originally, the author tells us, the minerals of the country were worked by slaves or serfs for the benefit of the lords of the soil; and Mr. Alford would have added to the interest of his note on the free miners had he mentioned the fact that the last native-born Briton who was a slave in Great Britain died in the reign of Queen Victoria. When the Queen ascended the throne, many men and women were still living who had in their youth borne a legal bondage in the collieries of Scotland. Such miners received wages, but were not allowed to move away from their master's estate. They were bought and sold with the property; and although they were freed from their servitude by an Act passed in 1799, the slave taint stuck to their occupation for many years.

Mr. Alford divides his work into nineteen chapters, dealing respectively with the principles of mining law, and with the mining laws of Great Britain, British India, Ceylon, Burma, the Malay Peninsula, British North Borneo, Egypt (should not a word of explanation have been given that Egypt is not a part of the British Empire?), Cyprus, the Dominion of Canada, British Guiana, the Gold Coast, Cape Colony, Natal, the Orange River Colony, the Transvaal Colony, Rhodesia, the Commonwealth of Australia, and New Zealand. An analysis of the mining laws cited shows a grouping of the principles of their construction into two classes:—(1) that in which the State or a private owner of mining property has the right to grant concessions or leases; and (2) that in which any individual, under specified restrictions, has the right to locate a certain limited area of ground or claim and to work or to dispose of it. It is surprising to learn that five-sixths of all the mining areas of the world are worked under the former system of titles. The concession system of large prospecting areas, followed by mining leases of limited areas, of which the present mining law of Egypt is an example, appears to be the most advantageous system of opening up an unexplored country.

As an authoritative statement of the conditions of tenure of mining property under various laws, Mr. Alford's book cannot fail to prove of great value to all connected with mining in the colonies. The work is most carefully and accurately done. There are, however, a few slight omissions; and in order to make the survey of the mining law of the British Empire complete, the author might with advantage

add, when a new edition is called for, a few particulars of the mining law of Newfoundland, the oldest British colony, where copper and iron-ore mining are actively carried on; of the West Indies, where, in Trinidad and Barbados, asphalt mining is of some importance; of British New Guinea, where gold mines are worked; and of Nigeria, where some tin ore is raised.

BENNETT H. BROUGH.

ORGANIC CHEMISTRY APPLIED TO PHYSIOLOGY.

Outlines of Physiological Chemistry. By Dr. S. P. Beebe and Prof. B. H. Buxton. Pp. vii+195. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1904.) Price 6s. 6d. net.

THE book deals chiefly with the theoretical side of organic chemistry as applied to physiology. The first chapter, of twenty-one pages, contains an account of the following matters:—dissociation in solution, nomenclature of acids, chemical equilibrium, catalysis, colloids and crystalloids, colloidal solutions of metals, aggregation, suspension and precipitation, oxidation and reduction, osmotic pressure, calculations of a formula, reasons why reactions take place, graphic formulæ, and ultimate analysis.

It need scarcely be added that the space is entirely inadequate to treat of such a heterogeneous collection of chemical problems, even were it profitable to put them in such juxtaposition. The student who has made any study of general chemistry does not need the chapter, and one who has not will scarcely be able to grasp it in the condensed and jumbled form in which it is here presented to him for the first time.

It would hence have been no loss if the book had commenced with the elementary organic chemistry of chapter ii., so as to leave all the space for this, which is the proper introduction to the subject of the book.

A description of the groups of organic compounds most interesting to the physiological chemist is given in chapters ii. to v., of the proteid molecule, its component parts and disintegration products in chapter vi., of enzymes in chapter vii., and an outline of the antitoxin theory, &c., under the title of "Disease and Immunity," forms chapter viii. and concludes the volume.

This latter part of the book is on the whole well and clearly written, but it might be made much more interesting by the authors breaking, even more frequently than they do, their intention of saying nothing about practical work. A description of organic compounds and their relationships, without any statement of what experiments the knowledge of these relationships is based upon, forms only dry and unprofitable reading. For example, it would be much better if the reader were told how the purin bases, or hexone bases, are separated, and would not have taken up a vast amount of space. Without some such instruction, these bodies are only uninteresting names which weary the reader.

The style of the authors is also such as may encourage a too-realistic belief in the mind of the junior

chemist in the graphic formulæ which form the organic chemist's rosary. Thus at the opening of chapter v. there occurs the statement, "The chains of C atoms have a tendency to curl over and join at the two ends, forming in this way a closed chain." At another passage in the volume one reads of "the excretion of benzene rings." The account of the chemistry of the proteid molecule is very clear and well arranged, and this portion of the book may be recommended to the physiological chemist interested in the organic chemistry of proteids.

BENJAMIN MOORE.

OUR BOOK SHELF.

Lectures on the Theory of Functions of Real Variables. Vol. i. By J. Pierpont. Pp. xii+560. (London and Boston: Ginn and Co., n.d.) Price 20s. net.

THIS is emphatically a text-book, deductive in method and Euclidean in arrangement; as such, it has the defects of its qualities, but its merits are undeniable. In this volume the author deals with the elementary notions of rational and irrational number, point aggregates, function, continuity, differentiation and integration. The subject last mentioned occupies pp. 333-560, so that conditions of integrability, change of order of integration, upper and lower integrals, &c., receive a proper amount of attention. It should be noted, too, that although it is confessedly incomplete, the discussion of maxima and minima of functions of two or more variables is satisfactory as far as it goes, a most unusual circumstance as things are at present. Perhaps the most valuable feature of novelty is that the author occasionally criticises arguments once thought sufficient, but now known to be fallacious, illustrating by examples the way in which the defective proofs break down. This is an excellent way of making a student feel the necessity of mastering the more refined methods of recent analysis. There is one point in which the author has not quite done justice to his authorities. After explaining Cantor's theory of irrational numbers, he gives a brief sketch of Dedekind's method of partitions, but he does not give this in its genuine form. The essence of a partition is that it divides all *rational* numbers (with the possible exception of one) into two classes, each element of one class being less than each of the other. After this definition it is proved that the aggregate of partitions is continuous. Prof. Pierpont (p. 82) defines a partition as dividing *all* real numbers into two classes; this enables him to use Dedekind's notation, when convenient, but it does not give a just idea of Dedekind's theory, and this is a pity. For bibliographical details the reader is referred to the "Encyclopädie der mathematischen Wissenschaften"; this is all very well for those who have access to that work, but in the interests of the student it would be well to give a list of the most important original sources. It ought to be said that in his preface the author acknowledges his special obligation to Jordan, Stolz, and Vallée-Poussin; at the same time it is evident that he has made use of this and other material in an independent way.

Sound and Rhythm. By W. Edmunds. Pp. xii+96; and *Box of Models of the Human Ear.* (London: Baillière, Tindall and Cox, 1906.) Price 2s. 6d. net.

THIS is an admirable little book. The elements of physiological acoustics are described with remarkable lucidity and accuracy, and there is a wealth of illustra-